

In re Patent Application of  
**SERGIO ET AL.**  
Serial No. **09/994,384**  
Filed: **NOVEMBER 26, 2001**

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**REMARKS**

Applicants thank the Examiner for the careful and thorough examination of the present application, and for extending all courtesies to Applicants' Attorney during the telephonic interviews of January 5 and 14, 2010.

During the telephonic interviews, Applicants proposed amending the independent claims to more clearly define over the prior art. The Examiner correctly noted that the proposed claim amendments define over the applied prior art references and place the application in condition for allowance, subject to an updated prior art search.

Applicants submit that all claims are patentable, and present arguments and amendments herein supporting such patentability.

**I. The Amended Claims**

Amended independent Claim 8 is directed to a method of reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors ordered in rows and columns functionally connected through row lines and through column lines substantially orthogonal to each other, using a biasing and reading circuit comprising column and row selectors, and a charge amplifier outputting a voltage of the pressure based capacitance of a selected pressure-sensing capacitor of the array. The method includes resetting an output voltage of the charge amplifier, and connecting nonselected row and column lines of the array to a reference voltage while connecting one

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of an auxiliary capacitor and the selected pressure-sensing capacitor to an input of the amplifier while connecting the other one of the auxiliary capacitor and the selected pressure-sensing capacitor to define a feedback capacitor of the amplifier. Claim 8 has been amended to recite the feedback capacitor being discharged by the connection of the nonselected row and column lines of the array to the reference voltage. Support for this claim amendment is found in paragraph 29 of the present application. The method further includes applying a step voltage on the one of the auxiliary capacitor and the selected pressure-sensing capacitor that is connected to the input of the amplifier and reading the output voltage at steady-state.

Amended independent Claim 11 is directed to a related method of reading a capacitive pressure sensor, and has been similarly amended. Amended independent Claim 15 is directed to a related system for reading a capacitive pressure sensor, and has been similarly amended. Amended independent Claim 19 is directed to a related integrated circuit for reading a capacitive pressure sensor, and has been similarly amended. Amended independent Claim 22 is directed to a combination capacitive pressure sensor device similar to Claim 19, and has been similarly amended.

## **II. The Amended Claims Are Patentable**

The Examiner rejected independent Claims 8, 11, 15, 19, and 22 over Smisko in view of Zhang, Nair et al., and Dickinson et al. As depicted in Figure 3 of Smisko, a photodiode read circuit is disclosed. The circuit comprises a plurality of photodiodes 108 coupled respectively to photodiode readout capacitors C1-N 114. Each photodiode is coupled to the charge amplifier circuit 85 by way of a transfer switch 116. The charge amplifier comprises an operational amp 123. The transfer switch is coupled to the inverting input 198 of the operational amp. The charge amplifier also includes a feedback capacitor 122 coupled between the output 197 of the operational amplifier and the inverting input with a reset switch 199 connected in parallel.

The Examiner correctly notes that Smisko fails to disclose an array of capacitors ordered in rows and columns functionally connected through row lines and through column lines substantially orthogonal to each other, and using a biasing and reading circuit comprising column and row selectors, as recited in amended independent Claim 8, for example. The Examiner looks to Zhang to supply this deficiency. Zhang discloses a CMOS imaging array including a rectangular matrix of pixels. (Col. 2, lines 30-37).

The Examiner correctly notes that Smisko and Zhang both fail to disclose capacitive sensors and looks to Nair et al. for this deficiency. Nair et al. discloses a Charge Coupled

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Device (CCD) image sensor with capacitive sensors arranged in a grid pattern.

The Examiner correctly notes that Smisko, Zhang, and Nair et al. fail to disclose pressure-sensing capacitors, as recited by amended independent Claim 8, for example. The Examiner looks to the newly cited Dickinson et al. reference for this deficiency. Dickinson et al. discloses an interface card for insertion into a laptop computer and for providing biometric identification of the user. The interface card includes a pair of separate sensors 45, 54. (Col. 8, line 53 through Col. 9, line 24; and Figure 11). The primary sensor includes a capacitive fingerprint sensor including an array of individual pixels for sensing the ridges and valleys of a user's fingerprint based upon capacitance differences on the user's finger. (Col. 9, lines 55-61). The secondary sensor is for sensing light. (Col. 9, lines 42-45).

As discussed above, Applicants have amended independent Claim 8, for example, to recite the feedback capacitor being discharged by the connection of the nonselected row and column lines of the array to the reference voltage. This feature of the claimed inventions provides for reduction in the parasitic capacitances from neighboring pixels. As correctly recognized by the Examiner during the telephonic interviews, none of the applied prior art references teaches or fairly suggests the claim recitation. Indeed, Smisko differently discloses that each pixel is coupled to a steady power supply during operation.

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Therefore, because of the above noted deficiency of the prior art references, Applicants submit that amended independent Claim 8 is patentable over the prior art. Amended independent Claims 11, 15, 19, and 22 are similar to Claim 8 and are patentable for similar reasoning. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

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**CONCLUSIONS**

In view of the claim amendments and arguments presented above, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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